CDM

Groundwater Monitoring Work Plan 2007

Former C-6 Facility
19503 South Normandie Avenue
Los Angeles, California

Boeing Realty Corporation

February 5, 2007

Prepared for:

Boeing Realty Corporation
4501 Conant Street
Building 851, M/C D851-0097
Long Beach, CA 90808

Prepared by:

CDM
18581 Teller Avenue, Suite 200
Irvine, California 92612

Project No. 5000-55353. T7B1

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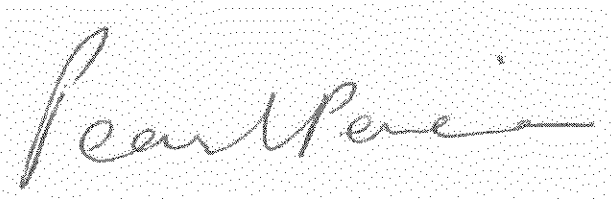
The information contained in the document titled "Groundwater Monitoring Work Plan 2007" for site "Former C-6 Facility, Los Angeles, California", dated February 5, 2007 has received appropriate technical review and approval. The conclusions and recommendations presented represent professional judgments and are based upon findings from the investigations and sampling identified in the report and the interpretation of such data based on our experience and background. This acknowledgement is made in lieu of all warranties, either expressed or implied. The activities outlined in this report were performed under the supervision of a California Registered Professional Engineer.

Prepared by:



Pearl Pereira
Staff Hydrogeologist

Reviewed and Approved by:

Ravi Subramanian, P.E.
Principal and Project Manager

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Section 1
Introduction

Camp Dresser & McKee Inc. (CDM), on behalf of Boeing Realty Corporation (BRC), has prepared this work plan for continuing groundwater monitoring at the BRC's Former C-6 Facility (Site) in Los Angeles, California (Figure 1). A total of approximately 50 groundwater monitoring events have been performed since 1987. Two monitoring events are planned for 2007 as listed below:

- A site-wide annual event in March; and
- A plume boundary-specific, semi-annual monitoring event in September.

This work plan identifies the groundwater monitoring wells that will be sampled and chemicals that will be analyzed during each event. This sampling program is separate from, but may overlap with, groundwater monitoring program(s) anticipated for 2007 under general or individual Waste Discharge Requirements (WDR) permits related to groundwater remediation. Results from the WDR monitoring program will be presented in separate reports. This work plan presents the Site background, the proposed groundwater monitoring program, and the reporting.

1.1 Background

1.1.1 Site Geology

The Site is located on the Torrance Plain physiographic area of the West Coast Basin. Groundwater monitoring wells and soil borings drilled at the Site have encountered the Lakewood Formation, consisting of two major Hydrostratigraphic Units: the Bellflower Unit; and the Gage Aquifer. The Bellflower Unit consists of the following stratigraphic units:

- Upper Bellflower Aquitard (UBF);
- Middle Bellflower B-Sand (B-Sand);
- Middle Bellflower Mud (MBFM);
- Middle Bellflower C-Sand (C-Sand); and
- Lower Bellflower Aquitard (LBF).

The upper 20 to 60 feet of the UBF below the Site consists of fine-grained soils (predominantly fine sands, silts, and clays) which thicken to the east. A sandy zone (Middle Bellflower Sand) that dips downward to the east underlies the fine-grained soils. The Middle Bellflower Sand is generally 60 to 100 feet thick and is a massive, light yellowish brown, fine to medium sand with discontinuous layers of fine-grained sediment (local silt and clay zones) that also dip downward to the east. A fine-grained

silt and clay layer, referred to as the MBFM, locally interrupts this sand. Where divided, the top sand subunits are referred to as the B-Sand; and the bottom sand subunits as the C-Sand. The MBFM is discontinuous across the Site and is comprised of laminated silts, laminated clays, and very fine sands. Thickness of the MBFM, wherever present, ranges from approximately 1 foot to 13 feet. The MBFM thins towards the north and appears to be absent in the northern portion of the Site (most of the former Building 1/36 portion of the Site).

The Middle Bellflower Sand is underlain by another fine-grained zone (LBF) at depths of approximately 120 to 140 feet below ground surface (bgs). The fine-grained LBF ranges in thickness from 10 to 20 feet and appears to be continuous across the Site. The LBF separates the Middle Bellflower Sand from the underlying Gage Aquifer.

1.1.2 Site Hydrogeology

Groundwater conditions at the Site have been characterized during previous investigations, groundwater monitoring events (CDM, 2006a and 2006b), and recent pre-remediation well installation activities (CDM, 2006c).

Groundwater at the site is encountered at depths of approximately 55 to 70 feet bgs in the relatively permeable sediments of the Bellflower Unit. Most of the groundwater monitoring wells at the Site have been installed in the B- and C-Sands within the Bellflower Unit.

The B-Sand is found at approximate depths of 55 to 70 feet bgs at the Site, and is generally 25 to 40 feet thick. The B-Sand predominantly consists of interbedded fine sands and silts. The most recent groundwater monitoring data for the Site indicates the groundwater flow within the B-Sand to be predominantly to the southeast, with an average gradient of 0.00123 ft/ft (CDM, 2006b).

The C-Sand is found at approximate depths of 90 to 110 feet bgs at the Site, and extends to approximate depths of up to 120 to 140 feet bgs. The C-Sand predominantly consists of interbedded very fine sands with silt and clay. Groundwater flow within the C-Sand is predominantly to the south, with an average gradient of 0.000939 ft/ft (CDM, 2006b).

The Gage Aquifer in the Site vicinity occurs at an approximate depth of 150 ft bgs, and ranges in thickness from 40 to 50 feet (Haley and Aldrich, 2005). The Gage Aquifer in the Site vicinity is predominantly sand. Groundwater flow within the Gage Aquifer is generally to the southeast with an average gradient of 0.000544 ft/ft (CDM, 2006b).

1.2 Groundwater Monitoring Well Summary

Groundwater wells installed at the Site are classified as follows:

- Groundwater monitoring wells installed at the Site by BRC and its predecessors (prefixes include WCC, TMW, CMW, MWB, MWC, and MWG);
- Groundwater monitoring wells installed at the Site by International Light Metals (ILM) for investigations at ILM (prefixes DAC and BL);
- Groundwater monitoring wells installed at the Site by Montrose Chemical Corporation (Montrose) for investigations at Montrose (prefix XMW); and
- Groundwater monitoring wells installed at the Site by BRC in support of bioremediation pilot testing (prefixes IRZ).

Groundwater investigations began in early 1987 with the installation of groundwater monitoring wells. A total of 87 groundwater monitoring wells have since been installed at the Site. Twenty of these groundwater monitoring wells have been abandoned as a result of redevelopment activities.

The long-range groundwater monitoring needs for the Site were outlined in the Site-Wide Groundwater Monitoring Work Plan (Haley and Aldrich, 2003), which proposed installation of additional B-Sand and C-Sand monitoring wells based on final re-development plans. This work plan was approved by the Los Angeles Regional Water Quality Board (LARWQCB, 2003). In addition to the groundwater monitoring wells proposed in the Site-wide Groundwater Monitoring Work Plan, additional groundwater monitoring wells were installed in 2005, based on Site access following redevelopment, to replace monitoring wells that were abandoned in 2004 due to the redevelopment of the Site. Four Gage Aquifer wells (MWG001 through MWG004) were also installed at the southern portion of the Site in 2005 as per the request by LARWQCB and U.S. Environmental Protection Agency (USEPA) (Haley and Aldrich, 2005).

As of December 2006, a total of 67 groundwater monitoring wells exist at the Site. This includes the 13 bioremediation groundwater monitoring wells (10 B-Sand and 3 C-Sand wells) installed in the southern portion of the Site in 2002, 2003 and 2004 to monitor the effectiveness of an In-situ Reactive Zone (IRZ) bioremediation pilot test, which was implemented in 2003 by Arcadis G&M, Inc. (Figure 2). This also includes six wells, which were installed at the Site in October and November 2006 in preparation for upcoming remedial activities, as documented in a letter to LARWQCB (CDM, 2006c). These consisted of: two wells, EWB001 (B-Sand) and EWC001 (C-Sand) installed in the northern parcel (former Building 1/36 area); and four C-Sand wells (EWC002, IWC001 , IWC002 and MWC024) installed in the southern parcel (former Building 2 area), as shown in Figure 2. Completion details for all the 67 groundwater monitoring wells to be sampled in 2007 are included in Table 1.

Approximately 50 groundwater monitoring events have taken place at the Site since monitoring began in 1987. All of the groundwater monitoring wells were typically sampled during each groundwater monitoring event, performed quarterly, until 1997. In 2000, the groundwater monitoring program was modified to two events per year consisting of: one full annual monitoring event; and one plume-boundary specific semiannual monitoring event (Kennedy Jenks Consultants, 2000).

Section 2
Proposed Groundwater Monitoring Program

The proposed 2007 groundwater monitoring program consists of two sampling events:

- A site-wide annual event in March 2007; and
- A plume boundary-specific, semiannual monitoring event in September 2007.

The above events are described in Sections 2.1 and 2.2. General monitoring considerations are described in Section 2.3. The monitoring program is presented in Table 2 and Figures 2, 3, and 4. As stated previously, this monitoring is separate from, but may overlap with, WDR-specific groundwater monitoring being performed at the Site. At times during the monitoring events, sampling at certain wells will concurrently satisfy both groundwater monitoring and WDR-specific monitoring requirements.

Some additional sampling and analyses, as appropriate, are also proposed for certain wells to collect additional data for evaluating remedial activities at the Site.

2.1 Annual Groundwater Monitoring

The site-wide annual monitoring event will be performed in March 2007. The routine groundwater monitoring program described in Section 2.3.2 will be performed at 48 groundwater monitoring wells and 13 bioremediation monitoring wells, as indicated in Table 2 and shown on Figure 2. This task will consist of the following activities:

- Measure static groundwater in 67 groundwater monitoring wells.
- Measure field parameters (from a calibrated probe placed in a flow through cell) consisting of pH, Dissolved oxygen (DO), oxidation-reduction potential (ORP), Electrical Conductivity (EC), and temperature using field test kits or meters at all 67 wells. A turbidity meter (Hach 2100P or equal) shall be used to monitor turbidity of the water during purging. Hach, Inc. field test kits will be used to measure ferrous iron (Fe [II]).
- Analyze 10% percent of the samples in the field using a CHEMetrics, Inc test kit (K-7512 or K-7540) as a quality assurance (QA) check on DO measurements.
- Collect groundwater samples from the 67 monitoring wells and analyze for VOCs by EPA Method 8260B.

- Collect groundwater samples from 22 select wells (13 B-Sand including two bioremediation wells [IRZB0095 and IRZMW001B], and nine C-Sand wells, including one bioremediation well [IRZCMW002]) as shown on Table 2 and analyze for the following dissolved gases and general minerals:

- Dissolved gases (carbon dioxide, nitrogen, ethane, ethane and methane) by RSK-175 and SM 4500-C (carbon dioxide) or equal;

- Total organic carbon (TOC) by EPA Method 415.1 or equal;

- Sulfate, nitrite, nitrate, ammonia nitrogen, orthophosphate, and chloride by EPA Method 300 Series or equal;

- Manganese II (Mn II) by SM 3500-MND or equal or using a field test kit;

- Total alkalinity by EPA Method 310 or equivalent or using a field test kit.

The 22 wells were selected in order to provide representative samples from the following areas: the northern and southern portions of the site; within and outside the bioremediation pilot test treatment zones; upgradient/crossgradient of the treatment zones; and near the site boundaries.

- Collect groundwater samples from seven wells (four B-Sand including two bioremediation wells [IRZB0095 and IRZMW001B], and three C-Sand wells), as shown on Table 2 and analyze for *Dehalococcoides* bacteria by Quantitative Polymerase Chain Reaction test (qPCR) to identify the amount of indigenous *Dehalococcoides* strains.

- Collect quality control samples consisting of duplicates (1 per 20 wells), and equipment/rinseate and trip blanks (each at a rate of 1 per day of sampling).

- Perform data validation on approximately 10 percent of the laboratory data for the primary samples as described in Section 2.4.4.

The monitoring methodology is presented in Section 2.4. If selected wells cannot be accessed for any reason, they will be scheduled for gauging and sampling during the next sampling event. Groundwater monitoring wells installed at the Site by Montrose and ILM will be accessed through coordination with their respective environmental contractors.

2.2 Quarterly Groundwater Monitoring

Six wells (i.e., EWB001, EWC001, EWC002, IWC001, IWC002, and MWC024), which were installed at the Site in October and November 2006 (Figure 3), are planned to be sampled in June 2007 to provide quarterly sampling data for the first year following well installation. The first sampling event for these wells was performed in November 2006, while the second and fourth sampling events will be performed as part of the March 2007 annual sampling event and the September 2007 semiannual

sampling event, respectively. The routine monitoring program described in Section 2.4.2 will be performed on these six new monitoring wells as indicated in Table 2 and shown on Figure 3. The monitoring methodology is presented in Section 2.4. This task is expected to include:

- Measure static groundwater in six groundwater monitoring wells.
- Measure field parameters (from a calibrated probe placed in a flow through cell) consisting of pH, DO, ORP, EC, temperature, turbidity, and Fe (II) using field test kits or meters in the six wells.
- Collect groundwater samples from six monitoring wells and analyze for VOCs by EPA Method 8260B.
- Collect quality control samples consisting of duplicates (1 per 20 wells), and equipment/rinseate and trip blanks (each at a rate of 1 per day of sampling).
- Perform data validation on approximately 10 percent of the laboratory data for the primary samples as described in Section 2.4.4.

2.3 Semiannual Groundwater Monitoring

The semiannual monitoring event will be performed in September 2007. The routine groundwater monitoring program, described in Section 2.3.2, will be performed at a reduced number (34) of groundwater monitoring wells as indicated in Table 2 and shown on Figure 4, and will focus primarily on the boundaries of the groundwater plumes. This event will also include the fourth and final round of quarterly monitoring for the six groundwater monitoring wells (i.e., EWB001, EWC001, EWC002, IWC001, IWC002, and MWC024) installed at the Site in 2006. This task will consist of the following activities:

- Measure static groundwater in 67 groundwater monitoring wells.
- Measure field parameters (from a calibrated probe placed in a flow through cell) consisting of pH, DO, ORP, EC, temperature, turbidity, and Fe (II) using field test kits or meters in the 34 wells.
- Analyze 10% percent of the samples in the field using a CHEMetrics, Inc test kit (K-7512 or K-7540) as a quality assurance (QA) check on DO measurements.
- Collect groundwater samples from 34 monitoring wells and analyze for VOCs by EPA Method 8260B.
- Collect quality control samples consisting of duplicates (1 per 20 wells), and equipment/rinseate and trip blanks (each at a rate of 1 per day of sampling).
- Perform data validation on approximately 10 percent of the laboratory data for the primary samples as described in Section 2.4.4.

The monitoring methodology is presented in Section 2.4. If selected wells cannot be accessed for any reason, they will be scheduled for gauging and sampling during the next sampling event.

2.4 Groundwater Monitoring Methodology

2.4.1 Health and Safety

The work will be performed by Tait Environmental Management (Tait) of Santa Ana, California under a Site-specific Health and Safety Plan (HSP) which has been developed in accordance with the federal Occupational Safety and Health Act (OSHA) and Cal-OSHA regulations (Title 29 CFR, Section 1910.120 and 8 CCR 5192).

2.4.2 Fieldwork - Groundwater Monitoring and Sampling

BRC will notify the LARWQCB a minimum of one week prior to the start of groundwater monitoring events. The activities described in the subsequent paragraphs will be performed.

2.4.2.1 Water Level Gauging

Prior to sampling each monitoring well, depth to groundwater will be measured to the nearest one-hundredth of a foot using an electronic water level sounder. Data from the well gauging will be recorded in the Well Gauging Data Sheet (Appendix A), as well as in an electronic format for upload to the project database. Monitoring well vapor concentrations will be measured with a photo-ionization detector (PID) following the removal of the well cap, and the results will be recorded on the Well Gauging Data Sheet. The Data Sheet will also include information on the surface condition of each well and any repairs/modifications that may have been conducted. During each monitoring event, all water level measurements will be collected within a single 24-hour period using the same water sounding tape.

2.4.2.2 Well Purging and Sampling

Groundwater monitoring wells during each event will be sampled in order of increasing concentrations. The sampling order will be determined based on the most recent groundwater analytical data available at the time of sampling. The sampling order for the March 2007 event is provided in Table 2.

Following well gauging, each well will be purged by extracting a minimum of three wetted well casing volumes of standing water with a pump. The depth to water, temperature, pH, turbidity, and EC will be measured and recorded periodically (after purging of each one-half wetted casing volume) on a Groundwater Sampling Data Sheet (Appendix A). DO, ORP, and other field parameters will also be measured in the field as per Table 2 and recorded on the Groundwater Sampling Data Sheets. The YSI unit or equal, with flow through cell, will be used to measure pH, DO, ORP, EC, and temperature. A turbidity meter (Hach 2100P or equal) will be used to monitor turbidity of the water during purging. A Hach, Inc. field test kit will be used to measure Fe (II). Purging will be deemed complete when a minimum of three wetted casing volumes have been removed and three consecutive measurements of pH, EC,

turbidity, DO, temperature are within ± 0.1 for pH, ± 3 percent for EC, and ± 10 percent each for turbidity, DO, and temperature. If parameters do not stabilize after five wetted volumes, purging will be deemed complete. Dedicated tubing will be used for each well to minimize the potential for cross-contamination.

The intake of the submersible pump will be placed at a depth as close to the center of the screened interval as possible. The purge rate will not exceed two gallons per minute (gpm) for four-inch diameter wells and one gpm for two-inch diameter wells. The water level will be monitored during purging and the purge rate will be adjusted so that the draw-down in the well is minimized to prevent groundwater from cascading down the interior sidewalls of the well casing.

After well purging parameters have stabilized, the pumping rate will be decreased to less than 0.1 gpm, and groundwater samples will be collected from the pump discharge in appropriate containers. Samples will be stored on ice in a cooler and transported by courier to a California-certified analytical laboratory for analysis under proper chain-of-custody protocols. Chain -of-custody forms will be maintained throughout sample collection and transport. An example chain-of-custody form is provided in Appendix A. The appropriate chain-of-custody information will also be electronically uploaded to the project database.

Equipment used for well purging and sampling will be cleaned prior to and between groundwater monitoring wells with an Alconox™ solution (or equivalent), then double-rinsed with tap water and deionized or distilled water to reduce the potential for cross-contamination. Well purge water and water used to decontaminate equipment will be stored in properly labeled, DOT-approved 55-gallon drums or other approved containers and stored on-Site at a location selected by BRC. The water will be properly manifested and disposed of by Tait following receipt of laboratory results.

Groundwater analytical results will be reported on RWQCB Laboratory Report Forms 10A/10B or their equivalent in units of milligrams per liter (mg/L) or micrograms per liter (µg/L), as appropriate. Field data will be collected and recorded on standard groundwater monitoring forms, and the laboratory data will be submitted electronically for upload to the project database.

2.4.3 Quality Assurance/Quality Control

2.4.3.1 Duplicate Samples

One duplicate groundwater sample will be collected for every 20 groundwater samples as a check for sample homogeneity and laboratory precision (four samples in March, one sample in June, and two in September). Duplicates will be collected, packaged, and sealed in the same manner as the primary samples. Duplicates will be assigned separate sample numbers and submitted blind to the laboratory. Duplicate samples will be analyzed for VOCs by EPA Method 8260B.

2.4.3.2 Equipment/Rinseate Blanks

One equipment/rinseate blank sample will be collected prior to initiation of sampling activities as a check for cross-contamination. Another sample will be collected each day throughout the duration of the sampling event when sampling equipment is cleaned and re-used in the field as a check for cross-contamination (an estimated 13 samples in March, one sample in June, and six samples in September). Deionized water will be used to fill or rinse the sampling equipment after the equipment has been cleaned, then collected in the sample containers. The equipment/ rinseate blanks will be analyzed for VOCs by EPA Method 8260B.

2.4.3.3 Trip Blanks

One trip blank will be prepared in the laboratory for each day that groundwater samples are collected and shipped to the laboratory (an estimated 13 samples in March, one sample in June, and six samples in September). The trip blanks will be prepared in a clean environment and kept in the cooler used to ship samples. The trip blank provides a check for contamination during transport, and will be analyzed for VOCs by EPA Method 8260B.

2.4.4 Data Validation

A subcontractor (Laboratory Data Consultants, Inc. [LDC] from Carlsbad, California) will perform three levels of data validation: Tier 1, Tier 2, and Tier 3 validation. The validation process will follow the U.S. Environmental Protection Agency (EPA) Contract Laboratory Program National Functional Guidelines for Organic Data Review (EPA, 1999 and 2002). Approximately 10 percent of the laboratory data for the primary samples will be reviewed during each monitoring event to verify that the data are of sufficient quality (seven samples from the March annual event, one sample from the June quarterly event, and three samples from the September semiannual event). The data packages to be validated will be selected randomly. Approximately 55 percent of the selected data packages will be subjected to Tier 1 validation, 40 percent will be subjected to Tier 2 validation, and 5 percent will be subjected to Tier 3 validation.

Section 3
Groundwater Monitoring Report

The report for the annual groundwater monitoring event will contain the following:

- Groundwater elevation contour maps for the B-Sand, the C-Sand, and the Gage Aquifer;
- Hydrographs for the B-Sand, the C-Sand, and the Gage Aquifer;
- Groundwater iso-concentration maps for key compounds of concern at the Site (TCE and 1,1-DCE) for the B-Sand and C-Sand;
- Tables summarizing groundwater analytical results;
- Groundwater sampling forms and field notes documenting field activities;
- Laboratory reports and chain-of-custody documentation;
- Data validation reports;
- Descriptions of the field activities, analytical results, and discussion and conclusions regarding water quality and hydrogeologic changes at the Site; and
- Recommendations for modifications to the sampling program, as appropriate.

The report for the semiannual groundwater monitoring event will contain the following:

- Groundwater elevation contour maps for the B-Sand, the C-Sand, and the Gage Aquifer;
- Tables and figures presenting the groundwater analytical results from June and the September events;
- Groundwater sampling forms and field notes documenting field activities;
- Laboratory reports and chain-of-custody documentation;
- Data validation reports; and
- Appropriate descriptions of the field activities and analytical results.

Reports will be submitted to the LARWQCB approximately 60 days after the receipt of laboratory results from each sampling event. With the annual and semiannual monitoring events occurring in March and September 2007, reports for these events will be provided to the LARWQCB by May 31 and November 30, 2007. The reports will consist of a hard copy of text, tables, figures, and the appendices containing the field and laboratory data. The reports will also be uploaded over the internet onto the State Water Resources Control Board (SWRCB) Geo Tracker data management system.

Section 4
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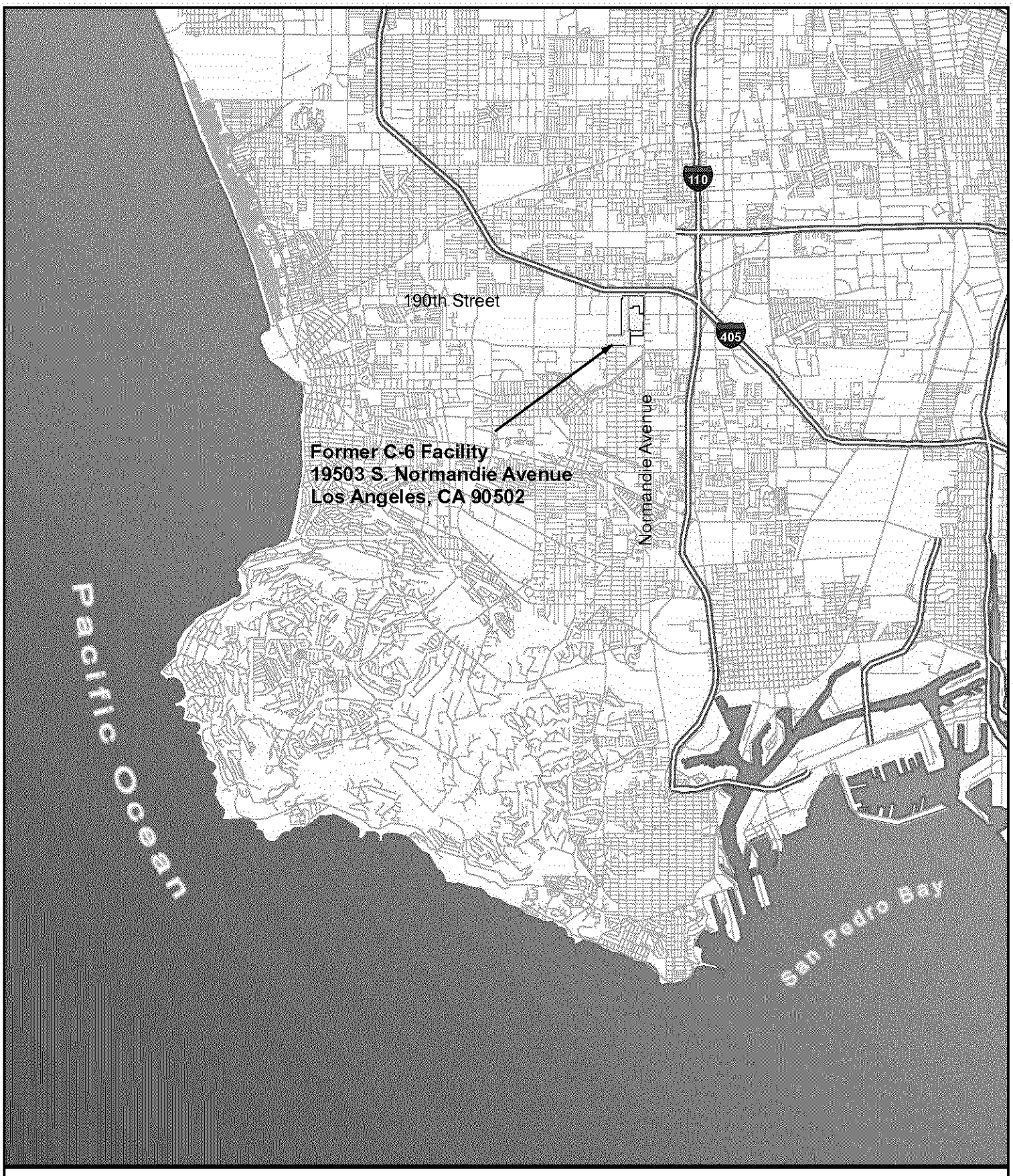
Section 5
Figures



2 0 2
Miles

N

Figure 1

Boeing Realty Corporation
Former C-6 Facility

Site Vicinity Map

CDM

100 0 100 200
Feet

N

190th Street

Normandie Avenue

Harborgate Way

Knox Street

Francisco Street

MWB020

PARCEL A

MWB007
MWC007
MWB006
WCC_03S
MWC006
MWC022
MWB027
WCC_04S
MWC023
WCC_05S
MWC011
WCC_06S
EWC001
WCC_07S
TMW_08
EWB001
MWB028
MWB003
TMW_07
MWC004
WCC_12S
MWB013
WCC_09S
MWC009

DAC-P1

PARCEL B

PARCEL C

MWG001
TMW_04
MW0005
MWB012
IRZMW002A/2B
IRZMW003A/3B
IRZMW001A/1B
TMW_15
MWG003
TMW_10
MWC021
MWC015
BL-03
TMW_06
MWC016
IRZMW005
IRZMW0081
IRZCMW001
IWC002
IRZB0095
CMW026
IRZMW004
IRZCMW003
XMW_19
MWG002
IWC001
MWC024
IRZCMW002
MWG004
MWB014
EWC002
TMW_14
TMW_11
CMW001
MWB019
MWC017

XMW-09
CMW002

PARCEL D

January 30, 2007

Legend

- Property Boundary
- Parcel Boundary
- B-Sand IRZ Bioremediation Monitoring Well
- C-Sand IRZ Bioremediation Monitoring Well
- Montrose Monitoring Well
- B-Sand Monitoring Well
- C-Sand Monitoring Well
- Gage Monitoring Well
- C-Sand Observation Well
- B-Sand Observation Well

CDM

Figure 2

Boeing Realty Corporation
Former C-6 Facility

Groundwater Monitoring Wells
March 2007 Annual Sampling Event

100 0 100 200
Feet

190th Street

PARCEL A

Normandie Avenue

EWC001

EWB001

Knox Street

PARCEL B

PARCEL C

Harborgate Way

IWC002

IWC001

MWC024

EWC002

Francisco Street

PARCEL D

February 2, 2007

Legend

- Property Boundary
- Parcel Boundary
- C-Sand Monitoring Well
- B-Sand Observation Well
- C-Sand Observation Well

CDM

N

Figure 3

Boeing Realty Corporation
Former C-6 Facility
Groundwater Monitoring Wells
June 2007
Quarterly Sampling Event

100 0 100 200
Feet

190th Street

MWB020

PARCEL A

MWB007
MWC007

WCC_03S
MWC022
MWB027
WCC_04S
MWC023
WCC_05S
EWC001
WCC_07S
EWB001

MWC004
WCC_12S
MWB013
Knox Street
WCC_09S
MWC009

Normandie Avenue

PARCEL B

PARCEL C

MWG001
TMW_10
MWC021
IWC002
XMW_19
Hartgrove Way
IWC001
MWG002
MWC024
EWC002
TMW_14
TMW_11
CMW001
MWB019
MWC017
Francisco Street
XMW-09
CMW002

PARCEL D

February 2, 2007

CDM

Legend

- Property Boundary
- Parcel Boundary
- Montrose Monitoring Well
- B-Sand Monitoring Well
- C-Sand Monitoring Well
- Gage Monitoring Well
- B-Sand Observation Well
- C-Sand Observation Well

N

Figure 4

Boeing Realty Corporation
Former C-6 Facility

Groundwater Monitoring Wells
September 2007 Semiannual
Sampling Event

BOE-C6-0052553

Section 6
Tables

Table 1
Groundwater Monitoring Well Completion Details
Boeing Reality Corporation, Former C-6 Facility
Los Angeles, California

Well I.D.	Water Bearing Unit	Easting[1,3]	Northing[1,3]	Reference Elevation (ft AMSL)[2]	Boring Total Depth (feet)	Screen Depth Interval (feet)	Depth to Top of Filter Pack (feet)	Casing Diameter (inches)	Casing Type	Slot Size (inches)	Drilled Date
B-Sand Monitoring Wells											
BL-03	B-Sand	1,768,747	6,468,962	58.66	79	59-79	56	2	Sch 40 PVC	0.01	2/8/1999
DAC-P1	B-Sand	1,769,774	6,468,953	55.13	90	60-90	55	4	Sch 40 PVC	0.01	9/25/1989
EWB001	B-Sand	6,470,381	1,769,604	53.01	90	59.2-89.2	56	6	Sch 80 PVC	0.02	11/9/2006
MW0005	B-Sand	1,769,063	6,470,232	52.1	85	65-85	63	4	Sch 40 PVC	0.01	8/8/2003
MWB003	B-Sand	1,769,474	6,470,193	56.95	92	65-90	63	2	Sch 40 PVC	0.02	11/30/2005
MWB006	B-Sand	1,770,051	6,470,251	53.9	93	65-90	63	2	Sch 40 PVC	0.02	12/1/2005
MWB007	B-Sand	1,770,213	6,470,211	51.39	92	60-90	57	4	Sch 40 PVC	0.02	6/6/2005
MWB012	B-Sand	1,769,019	6,470,035	52.43	90.5	64.5-84.5	62	4	Sch 40 PVC	0.02	5/17/2004
MWB013	B-Sand	1,769,396	6,469,592	55.33	86.5	65-85	62	4	Sch 40 PVC	0.02	5/17/2004
MWB014	B-Sand	1,768,387	6,470,280	51.69	86.5	65-85	62	4	Sch 40 PVC	0.02	5/17/2004
MWB019	B-Sand	1,768,093	6,469,970	55.18	90.5	65-85	62	4	Sch 40 PVC	0.02	5/17/2004
MWB020	B-Sand	1,770,863	6,470,396	51.07	120.5	59.5-89.5	56	4	Sch 40 PVC	0.02	6/6/2005
MWB027	B-Sand	1,769,934	6,469,948	57.14	91.5	67.5-87.5	65	2	Sch 40 PVC	0.02	11/30/2005
MWB028	B-Sand	1,769,475	6,470,106	56.84	93	65-90	63	2	Sch 40 PVC	0.02	12/1/2005
TMW_4	B-Sand	1,769,116	6,470,254	51.39	84	58-78	56	2	Sch 40 PVC	0.01	6/30/1998
TMW_6	B-Sand	1,768,718	6,470,299	51.72	93	67-87	66	2	Sch 40 PVC	0.01	7/1/1998
TMW_7	B-Sand	1,769,483	6,470,318	52.52	91	65-85	63	2	Sch 40 PVC	0.01	6/29/1998
TMW_8	B-Sand	1,769,594	6,470,329	53.99	90	61-81	59	2	Sch 40 PVC	0.01	6/29/1998
TMW_10	B-Sand	1,768,951	6,470,723	49.92	85	60.5-80.5	58	2	Sch 40 PVC	0.01	1/28/1999
TMW_11	B-Sand	1,768,204	6,470,721	49.85	83	58-78	55	2	Sch 40 PVC	0.01	2/1/1999
TMW_14	B-Sand	1,768,199	6,469,550	58.91	90	65-85	63	2	Sch 40 PVC	0.01	2/3/1999
TMW_15	B-Sand	1,768,950	6,469,555	57.65	92	62-87	60	2	Sch 40 PVC	0.01	2/4/1999
WCC_3S	B-Sand	1,770,021	6,470,367	51.12	92	69-89	64	4	Sch 40 PVC	0.01	10/26/1987
WCC_4S	B-Sand	1,769,857	6,470,499	52.23	92	70.5-90.5	65	4	Sch 40 PVC	0.01	10/27/1987
WCC_5S	B-Sand	1,769,779	6,470,722	52.82	91	61-91	64	4	Sch 40 PVC	0.01	11/24/1987
WCC_6S	B-Sand	1,769,734	6,470,336	51.32	91	60-90	54	4	Sch 40 PVC	0.01	9/22/1989
WCC_7S	B-Sand	1,769,695	6,470,505	52.21	91	60-90	54	4	Sch 40 PVC	0.01	6/8/1989
WCC_9S	B-Sand	1,769,409	6,470,683	57.39	92	60-90	55	4	Sch 40 PVC	0.01	9/21/1989
WCC_12S	B-Sand	1,769,496	6,470,506	51.32	92	60-90	55	4	Sch 40 PVC	0.01	9/17/1990
XMW-09	B-Sand	1,767,930	6,470,407	53.16	-	66-81	-	4	-	-	5/9/1989
XMW-19	B-Sand	1,768,538	6,470,722	49.38	-	63-79	-	4	-	-	3/30/1990

Table 1
Groundwater Monitoring Well Completion Details
Boeing Reality Corporation, Former C-6 Facility
Los Angeles, California

Well I.D.	Water Bearing Unit	Easting[1,3]	Northing[1, 3]	Reference Elevation (ft AMSL)[2]	Boring Total Depth (feet)	Screen Depth Interval (feet)	Depth to Top of Filter Pack (feet)	Casing Diameter (inches)	Casing Type	Slot Size (inches)	Drilled Date
C-Sand Monitoring Wells											
CMW0001	C-Sand	1,768,183	6,470,700	54.37	124	99-124	97	4	Sch 40 PVC	0.01	8/15/2003
CMW0002	C-Sand	1,767,936	6,470,554	52.81	124	99-124	97	4	Sch 40 PVC	0.01	8/14/2003
CMW026	C-Sand	1,768,603	6,470,279	51.53	117	92-117	90	4	Sch 40 PVC	0.01	8/6/2003
EWC001	C-Sand	6,470,359	1,769,706	52.59	125	97-122	94	4	Sch 80 PVC	0.02	11/8/2006
EWC002	C-Sand	6,470,267	1,768,368	51.76	125	96-121	93	4	Sch 80 PVC	0.02	10/20/2006
IWC001	C-Sand	6,470,121	1,768,453	53.6	125	95-115	92	4	Sch 80 PVC	0.02	11/2/2006
IWC002	C-Sand	6,470,239	1,768,669	51.56	125	96-116	93	4	Sch 80 PVC	0.02	10/31/2006
MWC004	C-Sand	1,769,491	6,470,486	51.86	118	96-116	93	4	Sch 40 PVC	0.02	6/7/2005
MWC006	C-Sand	1,770,037	6,470,252	54.03	117.5	95-115	93	2	Sch 40 PVC	0.02	11/29/2005
MWC007	C-Sand	1,770,172	6,470,172	51.57	119	97-117	93.5	4	Sch 40 PVC	0.02	6/3/2005
MWC009	C-Sand	1,769,365	6,470,658	53.99	125	101-121	97.5	4	Sch 40 PVC	0.02	4/28/2005
MWC011	C-Sand	1,769,749	6,470,263	54.03	117	94-114	92	2	Sch 40 PVC	0.02	11/29/2005
MWC015	C-Sand	1,768,821	6,470,304	51.51	128	100-125	99	4	Sch 40 PVC	0.02	5/17/2004
MWC016	C-Sand	1,768,720	6,469,987	52.61	131	102.5-127.5	101	4	Sch 40 PVC	0.02	5/17/2004
MWC017	C-Sand	1,768,093	6,469,979	55.16	128	100-125	99	4	Sch 40 PVC	0.02	5/17/2004
MWC021	C-Sand	1,768,939	6,470,705	54.53	126	97-122	94.5	4	Sch 40 PVC	0.02	5/17/2004
MWC022	C-Sand	1,769,986	6,470,454	51.6	120	97-117	93.5	4	Sch 40 PVC	0.02	6/7/2005
MWC023	C-Sand	1,769,802	6,470,428	51.43	120	97-117	94	4	Sch 40 PVC	0.02	6/7/2005
MWC024	C-Sand	6,470,266	1,768,409	51.64	125	96-121	93	4	Sch 80 PVC	0.02	10/26/2006
Bioremediation Monitoring Wells											
IRZB0081	B-Sand	1,768,714	6,470,037	50.28	-	64.5-89.5	63	0.75	Sch 40 PVC	0.01	9/4/2003
IRZB0095	B-Sand	1,768,619	6,470,038	50.08	-	65-90	63.2	0.75	Sch 40 PVC	0.01	9/5/2003
IRZMW001A	B-Sand	1,768,988	6,469,844	56.77	-	65-75	63	1.5	Sch 40 PVC	0.01	6/26/2002
IRZMW001B	B-Sand	1,768,988	6,469,844	56.7	-	80-90	79	1.5	Sch 40 PVC	0.01	6/26/2002
IRZMW002A	B-Sand	1,768,989	6,469,840	56.66	-	68-78	66	1.5	Sch 40 PVC	0.01	6/3/2003
IRZMW002B	B-Sand	1,768,989	6,469,840	56.76	-	83-93	82	1.5	Sch 40 PVC	0.01	6/3/2003
IRZMW003A	B-Sand	1,768,985	6,469,867	56.73	-	61-71	60	1.5	Sch 40 PVC	0.01	6/2/2003
IRZMW003B	B-Sand	1,768,985	6,469,867	56.78	-	80-90	79	1.5	Sch 40 PVC	0.01	6/2/2003
IRZMW004	B-Sand	1,768,610	6,470,051	53.06	-	65-90	63	4	Sch 40 PVC	0.01	9/4/2003
IRZMW005	B-Sand	1,768,708	6,470,038	52.77	-	65-90	63	4	Sch 40 PVC	0.01	9/5/2003
IRZCMW001	C-Sand	1,768,660	6,470,218	51.74	-	92-117	90	4	Sch 40 PVC	0.01	8/6/2003
IRZCMW002	C-Sand	1,768,410	6,470,417	55.6	-	96-121	94	4	Sch 40 PVC	0.01	5/12/2004
IRZCMW003	C-Sand	1,768,593	6,470,298	51.69	-	92-117	90	4	Sch 40 PVC	0.01	8/8/2003

Table 1
Groundwater Monitoring Well Completion Details
Boeing Reality Corporation, Former C-6 Facility
Los Angeles, California

Well I.D.	Water Bearing Unit	Easting[1,3]	Northing[1, 3]	Reference Elevation (ft AMSL)[2]	Boring Total Depth (feet)	Screen Depth Interval (feet)	Depth to Top of Filter Pack (feet)	Casing Diameter (inches)	Casing Type	Slot Size (inches)	Drilled Date
Gage Monitoring Wells											
MWG001	Gage Aquifer	1,769,149	6,470,706	54.13	190	156-186	152	2	Sch 40 PVC	0.02	4/22/2005
MWG002	Gage Aquifer	1,768,452	6,470,705	54.78	195	162-192	158	2	Sch 40 PVC	0.02	4/28/2005
MWG003	Gage Aquifer	1,768,915	6,470,056	53.079	185	154.5-184.5	150	2	Sch 40 PVC	0.02	9/12/2005
MWG004	Gage Aquifer	1,768,389	6,470,230	52.049	186	155-185	150	2	Sch 40 PVC	0.02	9/12/2005

[1] California State Plane North American Datum of 83 (NAD 83), Zone 5, Feet
[2] ft AMSL - Feet Above Mean Sea Level. Elevations based on North American Vertical Datum of 1988 (NAVD 88)
[3] Coordinates were slightly revised based on additional survey done in November 2006
- = Unknown

Table 2
2007 Groundwater Monitoring Program
Boeing Reality Corporation, Former C-6 Facility
Los Angeles, California

Well ID	Water Bearing Unit	Sampling Order (March 2007)[1]	March 2007[2] Annual Event Analytical Program					June 2007[5] Quarterly Event Analytical Program (for wells installed in 2006)				September 2007[5] Semiannual Event Analytical Program				
			Water Level Gauging	VOCs (8260B)	Field Parameters[3]	Dissolved Gases and Minerals[4]	qPCR	Water Level Gauging	VOCs (8260B)	Field Parameters	Dissolved Gases and Minerals[4, 6]	Water Level Gauging	VOCs (8260B)	Field Parameters[3]	Dissolved Gases and Minerals[4, 6]	qPCR[6]
B-Sand Monitoring Wells																
BL-03	B-Sand	34	x	x	x							x				
DAC-P1	B-Sand	62	x	x	x							x				
EWB001	B-Sand	65	x	x	x			x	x	x		x	x	x		
MW0005	B-Sand	57	x	x	x	x						x				
MWB003	B-Sand	49	x	x	x							x				
MWB006	B-Sand	60	x	x	x	x	x					x				
MWB007	B-Sand	41	x	x	x							x	x	x		
MWB012	B-Sand	26	x	x	x							x				
MWB013	B-Sand	3	x	x	x	x						x	x	x		
MWB014	B-Sand	25	x	x	x	x						x				
MWB019	B-Sand	30	x	x	x	x	x					x	x	x		
MWB020	B-Sand	12	x	x	x	x						x	x	x		
MWB027	B-Sand	27	x	x	x							x	x	x		
MWB028	B-Sand	15	x	x	x							x				
TMW_04	B-Sand	46	x	x	x							x				
TMW_06	B-Sand	23	x	x	x							x				
TMW_07	B-Sand	44	x	x	x	x						x				
TMW_08	B-Sand	59	x	x	x							x				
TMW_10	B-Sand	10	x	x	x	x						x	x	x		
TMW_11	B-Sand	7	x	x	x							x	x	x		
TMW_14	B-Sand	6	x	x	x							x	x	x		
TMW_15	B-Sand	11	x	x	x	x						x	x	x		
WCC_3S	B-Sand	50	x	x	x							x	x	x		
WCC_4S	B-Sand	36	x	x	x	x						x	x	x		
WCC_5S	B-Sand	8	x	x	x							x	x	x		
WCC_6S	B-Sand	64	x	x	x	x						x				
WCC_7S	B-Sand	24	x	x	x							x	x	x		
WCC_9S	B-Sand	17	x	x	x							x	x	x		
WCC_12S	B-Sand	19	x	x	x							x	x	x		
XMW-09	B-Sand	18	x	x	x							x	x	x		
XMW-19	B-Sand	1	x	x	x							x	x	x		

Table 2
2007 Groundwater Monitoring Program
Boeing Reality Corporation, Former C-6 Facility
Los Angeles, California

Well ID	Water Bearing Unit	Sampling Order (March 2007)[1]	March 2007[2] Annual Event Analytical Program					June 2007[5] Quarterly Event Analytical Program (for wells installed in 2006)				September 2007[5] Semiannual Event Analytical Program				
			Water Level Gauging	VOCs (8260B)	Field Parameters[3]	Dissolved Gases and Minerals[4]	qPCR	Water Level Gauging	VOCs (8260B)	Field Parameters	Dissolved Gases and Minerals[4, 6]	Water Level Gauging	VOCs (8260B)	Field Parameters[3]	Dissolved Gases and Minerals[4, 6]	qPCR[6]
C-Sand Monitoring Wells																
CMW001	C-Sand	4	x	x	x							x	x	x		
CMW002	C-Sand	31	x	x	x	x	x					x	x	x		
CMW026	C-Sand	21	x	x	x	x	x					x				
EWC001	C-Sand	55	x	x	x			x	x	x		x	x	x		
EWC002	C-Sand	56	x	x	x			x	x	x		x	x	x		
IWC001	C-Sand	51	x	x	x			x	x	x		x	x	x		
IWC002	C-Sand	47	x	x	x			x	x	x		x	x	x		
MWC004	C-Sand	38	x	x	x	x						x	x	x		
MWC006	C-Sand	58	x	x	x							x				
MWC007	C-Sand	2	x	x	x	x						x	x	x		
MWC009	C-Sand	33	x	x	x							x	x	x		
MWC011	C-Sand	16	x	x	x	x	x					x				
MWC015	C-Sand	42	x	x	x							x				
MWC016	C-Sand	43	x	x	x	x						x				
MWC017	C-Sand	39	x	x	x	x						x	x	x		
MWC021	C-Sand	9	x	x	x	x						x	x	x		
MWC022	C-Sand	20	x	x	x							x	x	x		
MWC023	C-Sand	54	x	x	x							x	x	x		
MWC024	C-Sand	48	x	x	x			x	x	x		x	x	x		
Gage Monitoring Wells																
MWG001	Gage	14	x	x	x							x	x	x		
MWG002	Gage	22	x	x	x							x	x	x		
MWG003	Gage	13	x	x	x							x				
MWG004	Gage	5	x	x	x							x				
Bioremediation Monitoring Wells																
IRZB0081	B-Sand	29	x	x	x							x				
IRZB0095	B-Sand	37	x	x	x	x	x					x				
IRZMW001A	B-Sand	66	x	x	x							x				
IRZMW001B	B-Sand	40	x	x	x	x	x					x				
IRZMW002A	B-Sand	63	x	x	x							x				
IRZMW002B	B-Sand	28	x	x	x							x				
IRZMW003A	B-Sand	67	x	x	x							x				
IRZMW003B	B-Sand	35	x	x	x							x				
IRZMW004	B-Sand	53	x	x	x							x				
IRZMW005	B-Sand	52	x	x	x							x				
IRZCMW001	C-Sand	45	x	x	x							x				
IRZCMW002	C-Sand	32	x	x	x	x						x				
IRZCMW003	C-Sand	61	x	x	x							x				

Table 2
2007 Groundwater Monitoring Program
Boeing Reality Corporation, Former C-6 Facility
Los Angeles, California

Well ID	Water Bearing Unit	Sampling Order (March 2007)[1]	March 2007 [2] Annual Event Analytical Program					June 2007 [5] Quarterly Event Analytical Program (for wells installed in 2006)				September 2007 [5] Semiannual Event Analytical Program				
			Water Level Gauging	VOCs (8260B)	Field Parameters [3]	Dissolved Gases and Minerals [4]	qPCR	Water Level Gauging	VOCs (8260B)	Field Parameters	Dissolved Gases and Minerals [4, 6]	Water Level Gauging	VOCs (8260B)	Field Parameters [3]	Dissolved Gases and Minerals [4, 6]	qPCR [6]
Quality Control Samples [7]																
Duplicates (1 per 20 wells)				x (4)					x (1)				x (2)			
Rinseate Blanks (1 per day)				x (13)					x (1)				x (6)			
Trip Blanks (1 per day)				x (13)					x (1)				x (6)			

Notes:
VOCs = Volatile organic compounds by EPA Method 8260B
Field Parameters = pH, Dissolved oxygen (DO), oxidation-reduction potential (ORP), turbidity, Electrical Conductivity (EC), temperature and ferrous iron
qPCR =Quantitative Polymerase Chain Reaction test for Dehalococcoides bacteria
[1] Sampling order for March 2007 is based on the results of the most recent sampling data available for the wells (combination of March 2006 annual, June 2006 quarterly, and September 2006 semiannual events)
[2] Groundwater monitoring wells installed in 2006 will be sampled quarterly with the first event performed in November 2006 and the last quartely event planned for September 2007.
[3] As a quality assurance (QA) check on DO measurements, 10% percent of the samples will be analyzed in the field using a CHEMetrics, Inc test kit (K-7512 or K-7540)
[4] See Section 2.1 of the Work plan for Dissolved Gases and General Minerals analyses
[5] Sampling order for June and September will be based on the results of the most recent groundwater analytical data available at the time of sampling
[6] The necessity for doing dissolved gases, general minerals, and qPCR analysis will be determined based on the results of the March 2007 event
[7] Quality control sample number based on estimated number of sampling days.

Appendix A
Field Forms

Well Gauging Data Sheet

Site Name: BRC, Former C-6 Facility
Project:

Well ID	Date	Time	Diameter (inches)	PID (ppm)	Measurement Point (mp)	Well Installation/Boring Depth (ft-bmp)	Screened Interval (feet)	Depth to Water (ft-bmp)	Depth to LNAPL (ft-bmp)	LNAPL Thickness (ft)	Total Depth (ft-bmp)	Personnel	Comments

Notes:

ft-bmp = Feet Below Measurement Point

Groundwater Sampling Data Sheet

Project Name:	**Date:**
Project No.: EM	**Prepared By:**
Well Identification:	**Weather:**
Measurement Point Description:	**Pump Intake:** **Screen:**

A	B	E	C								
Depth to LNAPL (ft-bmp)	**Depth to Static Water Level (ft-bmp)**	**Well Total Depth (ft-bmp)**	**Water Column Height (ft)** *(A – B = C)*	**LNAPL Thickness (ft-bmp)**	**One (1) Casing Volume (gallons)** *(C XD=E)*	**Three (3) Casing Volumes (gallons)** *(E x 3)*	**½ Casing Volume** *(E /2)*	**Above Screen Volume** *(Top screen – DTW) x D*	**Screen Volume** *(Screen length x D)*	**½ screen Volume**
---				---						

D	Gallons/Foot				Field Equipment: Solinst, Horiba
Well Diameter (in)	0.75	2	4	6	**Purge Method:**
Gallons per foot of casing	0.02	0.16	0.65	1.47	**Well Condition:**

Time	Casing/ Screen	Volume Purged (gallons)	Flow Rate (gpm)	Water Level (ft-bmp)	Ph	Temperature (°C)	Turbidity (NTU)	Conductivity ( )	Dissolved Oxygen (mg/L)	ORP (mV)	Observations

Purge Start Time	Purge End Time	Average Flow (gpm)	Total Gallons Purged	Total Casing Volumes Purged	80% Recovery Water Level Depth *B - (C x .80)*	Water Level at Sampling Time (ft-bmp)	Sample Collection Time	Sample Identification

Notes: **Dup.**

Drum No. :

ft-bmp = feet below measuring point

TestAmerica
ANALYTICAL TESTING CORPORATION

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☐ Nashville, TN ☐ Dayton, OH ☐ Indianapolis, IN
☐ Orlando, FL ☐ Watertown, WI
☐ Cedar Falls, IA ☐ Pontiac, MI

To assist us in using the proper analytical methods, is this work being conducted for regulatory purposes?

Compliance Monitoring? Yes No

Enforcement Action? Yes No

Client Name/Account #: ______________________

Address: ______________________

City/State/Zip: ______________________ **Report To:** ______________________

Project Manager: ______________________ **Invoice To:** ______________________

Telephone Number: ____________ **Fax No.:** ____________ **TA Quote #:** ______________________

Sampler Name: (Print) ______________________ **Project ID:** ______________________

Sampler Signature: ______________________ **Project #:** ______________________

							Preservative								Matrix						Analyze For:														
Sample ID / Description	Date Sampled	Time Sampled	No. of Containers Shipped	Grab	Composite	Field Filtered	Ice	HNO_3 (Red Label)	HCl (Blue Label)	NaOH (Orange Label)	H_2SO_4 Plastic (Yellow Label)	H_2SO_4 Glass(Yellow Label)	None (Black Label)	Other (Specify)	Groundwater	Wastewater	Drinking Water	Sludge	Soil	Other (specify):												**RUSH TAT (Pre-Schedule)**	Standard TAT	Fax Results	Send QC with report

Special Instructions:

Method of Shipment: FEDEX

Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by TestAmerica:	Date	Time

Laboratory Comments:

Temperature Upon Receipt:

VOCs Free of Headspace? Y N

BOE-C6-0052564